

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in Roller Assemblies for the Pressure Treatment of Materials

I, EDUARD KUSTERS, of Gladbacher Strasse 457, Krefeld, Germany, a German citizen, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to improvements in roller assemblies for the application of pressure to surfaces, e.g., for finishing, dyeing, calendering or embossing paper and textile material; mangling textile materials; drawing sheet metal, rubber and plastic sheeting; rolling plastic material into a sheet of predetermined thickness.

The specification of my prior Patent No. 807,293 described a roller assembly in which the pressure applying roller comprises a stationary core adapted to receive pressure at its ends, and an outer cylindrical cover which contacts the material to be treated, the cylindrical cover being mounted to rotate about the core and separated therefrom, the space between the cylindrical cover and the core being divided into two longitudinal chambers, one of which, i.e. the chamber adjacent to the portion of the outer cylindrical cover through which the pressure is applied, being filled with a suitable fluid, whereby as the outer cylindrical cover rotates a constant pressure will be maintained throughout its length and any tendency to become bowed prevented.

In carrying out many of the processes for which such a roller assembly can be employed it is advantageous that the pressure of the pressure applying roller should be capable of variation, this being of particular importance in the finishing, dyeing or calendering of certain kinds of textile fabrics and also to render the assembly capable of being used for treating material in narrow width form.

The object of the present invention is a

roller assembly having a pressure applying roller of the construction hereinbefore referred to which will have the aforesaid advantages.

The roller assembly according to the present invention comprises an upper and a lower roller, the upper roller consisting of a stationary rigid core surrounded by a hollow cylindrical casing, the space between the core and the casing being divided longitudinally into two chambers, the lower chamber of which, the chamber adjacent to the line of contact of the upper roller with the lower roller, is filled with liquid under pressure, a pump connected to the lower chamber for maintaining the pressure of the liquid therein and means for applying pressure to the ends of the core said means consisting of pistons operating in cylinders to which air or liquid under pressure can be admitted.

The lower roller of the assembly may be of similar construction to the upper roller in which case it is the upper chamber which is filled with liquid under pressure and connected to the pump. The invention is illustrated in and will be described with reference to the accompanying drawing which shows diagrammatically a roller assembly in which both rollers are formed with longitudinal chambers filled with liquid under pressure.

Each roller 6 or 7 is in the form of a hollow cylindrical casing carried by ball bearings 5 on the ends 1 or 2 of a stationary rigid longitudinal core 3 or 4.

The annular spaces between each roller 6 and 7 and the cores 3 and 4 is divided into two longitudinal chambers 8 or 9 and 10 or 11 separated from one another by division plates 12 and end seals 13. The chambers 8 and 9 adjacent to the line of contact of the roller 6 with the roller 7 is filled with pressure liquid e.g. hydraulic oil supplied by a pump 17 through the pipe 18 containing an oil filter 19. The oil pressure can be adjusted by a

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pressure regulator 20 the discharge 21 of which is connected to the oil container 22 for the pump 17. A pressure gauge 23 is provided to indicate the effective oil pressure.

5 The chambers 10 and 11 are connected to the oil container 22 by the pipes 24.

The ends 1 of the core 3 of the upper roller 6 are engaged by piston rods 14 of double acting pistons 16 operating in pressure cylinders 15 to load the ends 1 to maintain the roller 6 in contact with the roller 7.

10 Pressure air is supplied according to the position of a reversing valve 25 to the upper and lower faces of the piston 16. The compressed air supply is indicated at 26. Air is exhausted at 27.

In the position of the reversing valve 25 shown in the drawing air is admitted to the under side of the piston 16 via the pipes 20 28. To load the ends 1 the lever 29 of the reversing valve 25 is moved into the dot and dash line position whereby compressed air is led by the pipe 30 first to a differential regulator 31 and from the latter flows through the pipes 32 to the upper side of the pressure cylinders 15. The air pressure can be read on the pressure gauge 33. The pressure exerted by the pistons 16 on the ends 1 is regulated automatically against the pressure of the oil in the chambers 8 and 9 by means of the differential regulator 31 to which the oil pressure is admitted by the pipe 34.

The reversing valve 25 is provided with an adjusting device 35 such as a pressure reducer in the supply pipe 26 by means of which device the pressure of the air acting on the ends 1 of the core of the roller 6 can be adjusted within certain limits to enable the assembly to be used for the treatment of material of narrow width relative to the length of the rollers.

The control of the pump 17 serving to provide the roller chambers 8 and 9 with pressure liquid can be effected in an advantageous manner by means inserted into the pipe 30 leading from the reversing valve 25 to the differential regulator 31.

45 By means of the invention a roller assembly is provided which permits of a diversity of uses in the most varied fields, for example, in the textile industry, and the paper industry.

WHAT I CLAIM IS:—

1. A roller assembly applicable for any of the purposes specified comprising an upper and a lower roller, the upper roller consisting

of a rigid stationary core surrounded by a hollow cylindrical casing, the space between the core and the casing being divided longitudinally into two chambers, the lower chamber of which, i.e. the chamber adjacent to the line of contact of the upper roller with the lower roller, is filled with liquid under pressure, a pump connected to the lower chamber for maintaining the pressure of the liquid therein and means for applying pressure to the ends of the core said means consisting of pistons operating in cylinders to which air or liquid under pressure can be admitted.

2. A roller assembly as claimed in Claim 1 wherein the lower roller is of similar construction to the upper but having the upper chamber filled with liquid under pressure and connected to the pump.

3. A roller assembly as claimed in Claim 2 in which the hollow cylindrical casings of the rollers are supported by ball bearings on the ends of the cores.

4. A roller assembly as claimed in any one of the preceding claims wherein the pressure of the hydraulic liquid within the roller or rollers can be adjusted by means of a regulator in the pipe system from the pump.

5. A roller assembly as claimed in any one of the preceding claims in which the pressure loading the core ends of the upper roller is automatically controlled in relation to the liquid pressure within the upper roller or both rollers by a differential pressure regulator arranged in the pipe conveying the pressure air or liquid for loading the said core ends and also connected to the pipe system from the pump.

6. A roller assembly as claimed in any one of the preceding claims in which the means for loading each core end of the upper roller comprises a double acting piston operating in a cylinder the piston rod of which engages the said core end.

7. A roller assembly as claimed in Claim 6 in which air under pressure is supplied to the pistons through a valve.

8. A roller assembly applicable for any of the purposes specified substantially as described with reference to and as illustrated in the accompanying drawing.

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COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

